

Maharani Padmavati Govt. College for Women, Shahzadpur (Ambala)			
Lesson Plan : Session 2026-27 (Odd Semester)			
Name of the Teacher: Dr. Raj Kumari		Paper Code: B23-PHY-501	
Paper Name- Modern Physics (Major)		Faculty Name- Sciences	
Class: Bachelor of Physical Sciences Sem V		Session: 2026-2027	
Subject: Physics		Internal Marks: 20	
Period: II (1-3) Days		External Marks: 50	
Course Outcome		After completing this course, the learner will be able to: 1. Understand the need for Quantum Mechanics, Heisenberg's uncertainty principle, time-dependent and time-independent Schrodinger equation, expectation values of position and momentum, a particle confined in a one-dimensional box. 2. Familiar with the crystalline state, basis, crystal lattices, and reciprocal lattice to sc, bcc and fcc lattices. 3. Analyze the Hydrogen atom problem based on Sommerfeld theory, Vector Atom Model, LS&JJ coupling. 4. Familiar with various Nuclear Models, Magic Numbers, Classification of fundamental particles and Strange particles. 5. Learn to present observations, results, analysis and different concepts related to experiments of Quantum Mechanics and Solid State physics.	
Month	Week	Topics To be Covered	Assignment/ Test/ others
August	Week 1	Introductory Quantum Mechanics: Need of Quantum Mechanics, Planck's quantum hypothesis and radiation formula, quantization of EM radiation Photoelectric effect, Compton effect,	Test
	Week 2	de Broglie hypothesis, de-Broglie wave, wave packet, phase and group velocities, Time-dependent and time- independent Schrodinger equations,	
	Week 3	Properties of wave function, Probability current density, linear momentum and energy operators, commutator of position and linear momentum operator,	
	Week 4	expectation values of position and linear momentum, particle confined in a one-dimensional infinite box: energy eigen functions and eigenvalues. Heisenberg's Uncertainty Principle and its applications	
September	Week 1	Solid State Physics: Crystalline state, crystal lattice, basis, lattice translation vectors, primitive and non-primitive unit cells	Assignment
	Week 2	symmetry operations, Bravais lattices in two and three dimensions, Miller Indices, crystallographic planes, interplanar spacing, simple crystal structures:	
	Week 3	NaCl, CsCl, HCP, Zinc blende, Diamond structure	
	Week 4	diffraction of waves by crystals, Bragg's law, Idea of Reciprocal Lattice: Reciprocal lattice to sc, bcc and fcc lattices, non-crystalline solids (introduction only)	
October	Week 1	Atomic and Molecular Physics: Sommerfeld theory (qualitative), Relativistic correction, Fine structure of H α line, Lamb shift, Larmor's theorem (qualitative),	Mid-Term Examination
	Week 2	Vector Atom Model, electron spin, space quantization, spin-orbit Interaction energy, LS and JJ coupling, Spectral terms for equivalent and non-equivalent electrons,	
	Week 3	Anomalous Zeeman effect, Lande's g-factor, splitting of D1 and D2 lines in weak magnetic field, Raman effect, Stoke and Anti-stoke lines	
	Week 4	Nuclear and Particle Physics: Composition of nucleus, stability of nucleus, nuclear properties, nuclear size, spin, parity, magnetic moment, quadrupole moment,	
November	Week 1	Diwali Vacations (01/11/26-09/11/26)	Seminar
	Week 2	Nuclear Models, Liquid Drop Model and Semi-empirical Mass formula,	
	Week 3	Nuclear shell model and magic numbers (qualitative idea only), classification of fundamental particles,	
	Week 4	Quark and Lepton quantum numbers, Hadrons, Baryons and Mesons, Different types of interactions and their properties	
December	Week 1	Revision Tests	



Dr. Raj Kumari


Principal

**Maharani Padmawati Govt. College for Women
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Lesson Plan

Academic Year	2026-2027
Name of Assistant Professor	Dr Eena
Class and Semester	Bachelor of Physical Science sem 5 th
Subject	Mathematics
Paper	Sequence and Series
Course Outcomes: Understand the basic concepts of the real number system, set theory, and topology of the real line. Analyze the convergence, boundedness, and Cauchy properties of sequences of real numbers. Apply standard convergence tests to determine the convergence or divergence of infinite series. Differentiate between absolute and conditional convergence and analyze alternating and general series. Verify the convergence of sequences and infinite series using appropriate mathematical tests and computational tools.	
August 2026	
Week - 1	Boundedness of the set of real numbers, Least upper bound and Greatest lower bound of a set. Archimedean, algebraic and ordered properties in $\mathbb{R}$.
Week - 2	The real number system as a complete ordered field. Neighbourhoods, interior points, isolated points, limit points, Open sets,
Week - 3	Open sets, closed sets, interior of a set, closure of a set in real numbers and their properties.
Week - 4	Bolzano-Weierstrass theorem. Open covers, compact sets and Heine-Borel theorem.
September 2026	
Week - 1	Denumerable and non-denumerable sets, Denumerability of integers, rationals and non-denumerability of real numbers.
Week - 2	Sequences: Real sequences and their convergence, Theorems on limit of sequence, Bounded and monotonic sequences, Cauchy's sequence,
Week - 3	Cauchy general principle of convergence, Subsequences and subsequential limits, Limit superior and limit inferior.
Week - 4	Revision and Test
October 2026	
Week - 1	Infinite series: Convergence and divergence of Infinite Series, Comparison tests of positive terms infinite series, Cauchy's general principle of Convergence of series,
Week - 2	Convergence and divergence of geometric series, Hyper Harmonic series or p series, D-Alembert's ratio test, Raabe's test, Logarithmic test, Cauchy's nth root test,
Week - 3	De-Morgan and Bertrand's test, Gauss 12 Test, Cauchy's integral test, Cauchy's condensation test.

Week - 4	Alternating series, Absolute and conditional convergence, Leibnitz test. Arbitrary series
November 2026	
Week -1	Diwali Holiday
Week - 2	Arbitrary series, Abel's and Dirichlet's test, Insertion and removal of parenthesis, Re-arrangement of terms in a series
Week - 3	Riemann's re-arrangement theorem and Pringsheim's theorem (statement only). Cauchy product of series (definitions and examples only).
Week - 4	Revision and class test of first and second unit.
Week - 5	Revision and Class test of third and fourth unit.

December 2026 Week 1. Revision

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Lesson plan

External Marks:50

Academic Session : 2026-27(Odd Semester)

Class : BA/BSC Sem -V

Paper : Data Structures

Teacher's Name : Dr. Ravi Kumar Barwal

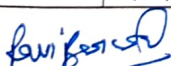
Course Outcomes: 1. Learn the basics of data structure and algorithm complexities.

2. Acquire knowledge of arrays and strings.

3. Understand the idea of implementation for linked lists and stacks.

4. Learn various searching and sorting techniques along with the implementation of queues

Month	Dates	Topic to be covered	Assignment/Tests/Activities
Aug	1 st Week	Data Structure Definition, Data Type vs. Data Structure, Classification of Data Structures, Data Structure Operations, Applications of Data Structures.	Assignment 1
	2 nd Week	Algorithm Specifications: Performance Analysis and Measurement (Time and Space Analysis of Algorithms- Average, Best and Worst Case Analysis).	
	3 rd Week	Arrays: Introduction, Linear Arrays, Representation of Linear Array in Memory, Two Dimensional and Multidimensional Arrays,	Test 1
	4 th Week	Sparse Matrix and its Representation, Operations on Array: Algorithm for Traversal, Selection, Insertion, Deletion and its implementation	
Sept	1 st Week	String Handling: Storage of Strings, Operations on Strings viz., Length, Concatenation,	Assignment 2
	2 nd Week	Substring, Insertion, Deletion, Replacement, Pattern Matching	
	3 rd Week	Linked List: Introduction, Array vs. linked list, Representation of linked lists in Memory, Traversing a Linked List,	Test 2
	4 th Week	Insertion, Deletion, Searching into a Linked list, Type of Linked List	
Oct	1 st Week	Stack: Array Representation of Stack, Linked List Representation of Stack, Algorithms for Push and Pop,	Assignment 3
	2 nd Week	Application of Stack: Polish Notation, Postfix Evaluation Algorithms, Infix to Postfix Conversion, Infix to Prefix Conversion, Recursion.	
	3 rd Week	Introduction to Queues: Simple Queue, Double Ended Queue, Circular Queue, Priority Queue, Representation of Queues as Linked List and Array,	Test 3
	4 th Week	Applications of Queue. Algorithm on Insertion and Deletion in Simple Queue and Circular Queue. Priority Queues	
Nov.	1 st Week	Diwali Break	Assignment 4
	2 nd Week	Tree: Definitions and Concepts, Representation of Binary Tree, Binary Tree Traversal (Inorder, postorder, preorder), Binary Search Trees – Definition, Operations viz., searching, insertions and deletion;	
	3 rd Week	Searching and Sorting Techniques, Sorting Techniques: Bubble sort, Merge sort, Selection sort, Quick sort, Insertion Sort. Searching Techniques: Sequential Searching, Binary Searching	Test 4
	4 th Week	Revision	


Ravi Barwal

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Lesson Plan

Academic Session: 1st August to 4th December (2026-27)

Class Name : BSc. III (5th Semester)

Course Name : Chemistry-V (Course Code: B23-CHE-501 & Course Type: CC/MCC)

Teacher's Name: Dr. Rajni Mohil

Max marks: 70+30* Internal Assessment Marks: 20+10*

End Term Exam Marks: 50+20*

Month	Dates	Topic to be covered	Assignments/ Tests/activities
Aug	1 st week	Coordination Compounds: Werner's theory of coordination compounds, EAN, chelates	
	2 nd week	Nomenclature of coordination compounds, isomerism in coordination compounds	
	3 rd week	Metal Ligand Bonding in Transition Metal Complexes: Valence bond theory, applications and their Limitation,	
	4 th week	Elementary idea of CFT (Only structural aspects), Crystal field splitting in octahedral, tetrahedral complexes. Crystal field splitting in square planer complexes.	
Sept.	1 st week	Magnetic properties of transition metal complexes: Types of magnetic materials, magnetic susceptibility	Assignment-I
	2 nd week	Method of determination, spin only formula, basic idea of L-S coupling. Revision	
	3 rd week	Thermodynamics-II: Third Law of Thermodynamics, Nernst Heat Theorem, Statement of concept of residual entropy, evaluation absolute entropy from heat capacity data. Gibbs function and Helmholtz Function as thermodynamic quantities.	
	4 th week	Criteria for thermodynamic equilibrium and spontaneity. Variation of G with P, V and T, Partial molar properties, concept of chemical potential (numerical included)	
	5 th week	Phase Equilibria: Statement and the meaning of terms-phase component and degree of freedom, Thermodynamic derivation of Gibbs phase rule.	
Oct.	1 st week	Phase equilibria of one component system-water system, phase equilibria of two component systems solid-liquid	Assignment

		equilibria.Simple Eutectic Pb-Ag system.	ut-II
	2 nd week	Quantum Mechanics-I: Black body radiation, plank's radiation law, Explanation of spectral distribution of black body radiation on the basis of classical mechanics and quantum mechanics, Heat capacity of solids, Need of quantum mechanics, postulates of quantum mechanics, quantum mechanical operator, Commutation relations	
	3 rd week	Hamiltonian operator, Role of operators to derive Schrodinger wave equation, Application Schrodinger wave equation in determination of wave function and energy of a particle in one dimensional box.	
	4 th week	Spectroscopy-I: Electromagnetic radiations, reasons of electromagnetic spectrum, basic features of spectroscopy, introduction to molecular spectroscopy and its difference from atomic spectroscopy, signal to noise ratio, resolving power of spectrophotometer, bornoppenheimer approximation, Concept of degree of freedom	
	5 th week	Rotational Spectrum: Energy levels of rigid rotator of diatomic molecules, selection rules, spectral intensity distribution using Maxwell-Boltzmann distribution, Determination of bondlength and concept of isotopic effect	
Nov	1 st week	Diwali Vacations (1.11.2026-09.11.2026)	
	2 nd week	Organic Synthesis via Enolates Acidity of α -hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate	Test
	3 rd week	Heterocyclic Compounds Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution.	
	4 th week	Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole. Revision	
Dec	1 st week	Revision	

Course Learning Outcomes (CLO): After completing this course, the student will be able to:

1. Understand the basis of coordination chemistry of complexes.
2. Learn about role of thermodynamics and equilibrium in predicting various physical properties of systems.
3. Get knowledge about the quantum mechanical properties and analysis of diatomic molecules by spectroscopy.
4. To understand the synthesis and mechanism of some organic reactions and heterocyclic compounds.


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Lesson Plan

Academic Session: 1st August to 4th December (2026-27)

Class Name : **BSc. III (5th Semester)**

Course Name : **Cosmetic Chemistry** (Course Code: B23-CHE-123 & Course Type: VOC)

Teacher's Name: **Dr. Rajni Mohil**

Max. Marks: 50 + 50* Internal Assessment Marks: 15 + 15*

End Term Exam Marks: 35 + 35*

Month	Dates	Topic to be covered	Assignments/ Tests/activities
Aug	1 st week	Cosmetics- Definition, History, Classification, Ingredients, Nomenclature.	
	2 nd week	A general study including preparation and uses of the Hair dye	
	3 rd week	A general study including preparation and uses of the Hair spray	
	4 th week	A general study including preparation and uses of the Shampoo & conditioners.	
Sept.	1 st week	Preparation and uses of Face powder	Assignment -I
	2 nd week	Preparation and uses of Lipsticks	
	3 rd week	Preparation and uses of Talcum powder & Nail enamel.	
	4 th week	Preparation and uses of creams (cold, vanishing, and shaving creams), Antiperspirants and Artificial flavours.	
	5 th week	Preparation and uses of creams (cold, vanishing, and shaving creams)	
Oct.	1 st week	Preparation and uses of Antiperspirants and Artificial flavours.	Assignment -II
	2 nd week	Essential oils and their importance in cosmetic industries	
	3 rd week	Eugenol, Geraniol, Sandalwood oil	
	4 th week	Eucalyptus, Rose oil, Jasmine	
	5 th week	Civetone.	
Nov	1 st week	Diwali Vacations (1.11.2026-09.11.2026)	
	2 nd week	Revision	Test
	3 rd week	Revision	

	4 th week	Revision	
Dec	1 st week	Revision	

Course Learning Outcomes (CLO): After completing this course, the student will be able to:

1. Get the knowledge of cosmetics;
2. Logically think regarding preparation strategies and uses of cosmetic products;
3. Understand about preparation strategies and uses of cosmetic creams;
4. Get to know about the essential oils preset in nature & their importance towards industrial uses.

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